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[54]发明名称 马氏体时效钢高尔夫球头

[57]摘要

本发明提出一种用马氏体时效钢精密铸造整体成型制做的高尔夫球头，马氏体时效钢材料主要由镍、钴、钼、钛、铝和铁元素组成，由马氏体时效钢材料制做的高尔夫球头打击效果好，球手的感觉很好。

权 利 要 求 书

1. 一种马氏体时效钢高尔夫球头，其特征在于：马氏体时效钢通过精密铸造整体成形法制造其中马氏体时效钢按以下几种元素成份的重量百分比组成：镍 Ni:17－19，钴 Co:8－13，钼 Mo:3－5，钛 Ti:0.1－1.6，铝 Al:0.1－0.2，铁 Fe:余量。

2. 根据权利要求 1 所述的球头，其特征在于：马氏体时效钢可按以下几种元素成份的重量百分比组成：镍 Ni:6－8，锰 Mn:3－5，钼 Mo:3－5，铝 Al:0.1－0.2，铁 Fe:余量。

3. 根据权利要求 1 所述的球头，其特征在于：马氏体时效钢可按以下几种元素成份的重量百分比组成：镍 Ni:8－13，铬 Cr:4－18，钼 Mo:2－4，铝 Al:0.03－1.0，钛 Ti:0.1－0.3，铁 Fe:余量。

4. 根据权利要求 1 所述的球头，其特征在于：马氏体时效钢可按以下几种元素成份的重量百分比组成：镍 Ni:7－12，铬 Cr:8－13，钼 Mo:2－6，钴 Co:2－10，钛 Ti:0.1－1.0，铁 Fe:余量。

说　明　书

马氏体时效钢高尔夫球头

本发明提出一种马氏体时效钢制作的高尔夫球头。

目前，高尔夫球头普遍用不锈钢或钛合金制作，由于这两种金属材料所特有的性能，使得高尔夫球打击效果尚未达到最佳状态。

本发明的目的是提出一种用马氏体时效钢材料做的高尔夫球头，其打击效果好，在同样的打击力下，要比现有的高尔夫球头击球距离远，球手的感觉更好。

本发明目的是这样实现的：马氏体时效钢有以下四种，第一种为*18Ni*型马氏体时效钢，其各种元素成分的重量百分比为：镍*Ni*:17－19，钴*Co*:8－13，钼*Mo*:3－5，钛*Ti*:0.1－1.6，铝*Al*:0.1－0.2，铁*Fe*:余量。第二种少*Ni*无*Co*型马氏体时效钢，其各种元素成分的重量百分比为：镍*Ni*:6－8，锰*Mn*:3－5，钼*Mo*:3－5，铝*Al*:0.1－0.2，铁*Fe*:余量。第三种不锈型（不含*Co*）马氏体时效钢，其各种元素成分的重量百分比为：镍*Ni*:8－13，铬*Cr*:4－18，钼*Mo*:2－4，铝*Al*: 0.03－1.0，钛*Ti*:0.1－0.3，铁*Fe*: 余量。第四种不锈型（含*Co*）马氏体时效钢，其各种元素成分的重量百分比为：镍*Ni*:7－12，铬*Cr*:8－13，钼*Mo*:2－6，钛*Ti*:0.1－1.0，铁*Fe*:余量。以上四种材料通过精密铸造整体成形法制做成高尔夫球头。

本发明使得球手在同样的打击力下，高尔夫球能飞出更远的距离，打击效果好，使球手打击时手感舒服。同时目前钛合金（*Ti*－*6Al*－*4V*）高尔夫球头，其材质的抗拉强度σ_b=*1015MPa*，σ_s=*945Mpa*，*HRC30*，而马氏体时效不锈钢σ_b=*1500MPa*，σ_s=*1300MPa*，*HRC48*，由此可见，马氏体时效钢高尔夫球头的性能

均高于钛合金球头。

实施例 1:

采用 18Ni(350ksi 级) 马氏体时效钢制造高尔夫球头，与钛合金球头相比性能显著提高。材质抗拉强度 σ_b=2400MPa, σ_s=2350MPa, δ=6～7%, HRC56～58。

实施例 2:

采用马氏体时效不锈钢（不含 Co）制造高尔头球头，其材质 σ_b=1600MPa, σ_s=1500MPa, δ=10～20, HRC45～47。

实施例 3:

采用马氏体时效不锈钢（含 CO）制造高尔夫球头，其材质 σ_b=2450MPa, σ_s=2400MPa, δ=6～10%, HRC48～50。

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[54] Title of the Invention:

Golf Club Head of Martensitic Aging Steel

[57] Abstract

The present invention has disclosed a golf club head made of a precision integral cast formed article by martensitic aging steel of which the material of the martensitic aging steel is of elements of nickel, cobalt, molybdenum, titanium, aluminum and iron. The golf club head made of the martensitic aging steel has a better striking effect and a comfortable hand feeling to a player.

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We claim

1. A golf club head of martensitic aging steel, characterized in that, the martensitic aging steel is made by a precision integral cast formation method, wherein the martensitic aging steel is composed of the following elements with a weight percentage: nickel: 17 - 19, cobalt: 8 - 13, molybdenum: 3 - 5, titanium: 0.1 - 1.6, aluminum: 0.1 - 0.2, iron: the remainder.

2. The club head according to claim 1, characterized in that, the martensitic aging steel can be of the following elements with a weight percentage: nickel: 6 - 8, magnum: 3 - 5, molybdenum: 3 - 5, aluminum: 0.1 - 0.2 and iron: the remainder.

3. The club head according to claim 1, characterized in that, the martensitic aging steel can be of the following elements with a weight percentage: nickel: 8 - 13, chromium: 4 - 18, molybdenum: 2 - 4, aluminum: 0.03 - 1.0, titanium: 0.1 - 0.3 and iron: the remainder.

4. The club head according to claim 1, characterized in that, the martensitic aging steel can be of the following elements with a weight percentage: nickel: 7 - 12, chromium: 8 - 13, molybdenum: 2 - 6, cobalt: 2 - 1.0, titanium: 0.1 - 1.0 and iron: the remainder.

A Golf club head of Martensitic Aging Steel

The present invention relates to a golf club head made of martensitic aging steel.

Currently the golf club head is generally made of a stainless steel or a titanium alloy. Because these two materials have a specific performance, the striking effect of the golf club head is not perfectively satisfactory.

The object of the present invention is to suggest a golf club head of martensitic aging steel which is of a better striking effect and under an equivalent striking force, the golf ball can be struck further than a conventional one and the golf club head is of a better hand feeling to a player.

The object of the present invention is so reached that, the martensitic aging steel can be any one of the following four kinds. The first kind is an 18Ni type of martensitic aging steel which has a weight percentage of respective elements: nickel: 17 - 19, cobalt: 8 - 13, molybdenum: 3 - 5, titanium: 0.1 - 1.6, aluminum: 0.1 - 0.2, iron: the remainder. The second kind is a less Ni element (with no Co) type of martensitic aging steel which has a weight percentage: nickel: 6 - 8, magnum: 3 - 5, molybdenum: 3 - 5, aluminum: 0.1 - 0.2, and iron: the remainder. The third kind is a stainless (with no Co) type martensitic aging steel which has a weight percentage: nickel: 8 - 13, chromium: 4 - 18, molybdenum: 2 - 4, aluminum: 0.03

- 1.0, titanium: 0.1 - 0.3 and iron: the remainder. And the fourth kind is a stainless (with Co) type martensitic aging steel which has a weight percentage: nickel: 7 - 12, chromium: 8 - 13, molybdenum: 2 - 6, titanium: 0.1 - 1.0 and iron: the remainder. The four above mentioned materials can be made into golf club heads through a precision integral cast formation method.

With the present invention, and when struck by an equivalent force, the golf ball can fly further and thus can be said to have a better striking effect so that the player may feel comfortable. Currently the golf club head of a titanium alloy (Ti - 6Al - 4V) is of a material with tensile strength σ_b = 1015MPa, σ_B = 945MPa, HRC30, while the martensitic aging stainless steel σ_b = 1500MPa, σ_B = 1300MPa, HRC48. Therefore the performance of the golf club head of martensitic aging steel is better than that of the club head of titanium alloy.

Embodiment 1:

Martensitic aging steel of 18Ni(grade 350ksi) is adopted to produce the golf club head. Its performance is significantly improved when compared to a titanium club head. Its tensile strength of the material is σ_b = 2400MPa, σ_B = 2350MPa, δ= 6~7%, HRC56 ~ 58.

Embodiment 2:

Martensitic aging steel of stainless steel (with no Co)

is adopted to produce the golf club head. The material is of σ_b = 1600MPa, σ_B = 1500MPa, δ= 10~20%, HRC45 ~ 47.

Embodiment 3:

Martensitic aging steel of stainless steel (with Co) is adopted to produce the golf club head. The material is of σ_b = 2450MPa, σ_B = 2400MPa, δ= 6~10%, HRC48 ~ 50.